

**WHAT IS CLAIMED IS:**

1. An optical device comprising:

a first medium having a thickness, the first medium defining a plurality of periodically spaced concave portions throughout a first layer of the first medium, the concave portions having a depth less than the thickness of the first medium; and

a second medium being dispersed within the concave portions formed in the first medium,

wherein a first layer of the device forms a photonic crystal and includes the first layer of the first medium, and

wherein a second layer of the device is formed entirely of the first medium.

2. An optical device according to claim 1 wherein the first medium has an

index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium.

3. An optical device according to claim 2 wherein the index of refraction of

the second medium is greater than the index of refraction of the first medium.

4. A method of manufacturing an optical device having a first layer

functioning as an optical waveguide layer and a second layer functioning as a base layer, the method comprising the steps of:

providing a resist layer on a surface of a first medium;

removing portions of the resist layer to form vacancies;

removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium;

removing the resist layer completely;

filling the cavities in the first medium with a second medium; and

removing any excess film of the second medium from the surface of the first medium.

5. A method according to claim 4 wherein the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium.

6. A method according to claim 5 wherein the index of refraction of the second medium is greater than the index of refraction of the first medium.

7. An optical device comprising:

a first medium having a thickness, the first medium at least partially forming a first layer and a second layer of the optical device, the first layer having a plurality of periodically spaced protruding portions surrounded by concave portions having a depth less than the thickness of the first medium; and

a second medium being dispersed within the concave portions surrounding the plurality of periodically spaced protruding portions of the first layer,

wherein the first layer is a photonic crystal, and the second layer is formed entirely of the first medium.

8. An optical device according to claim 7 wherein the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium.

9. An optical device according to claim 8 wherein the index of refraction of the second medium is greater than the index of refraction of the first medium.

10. A method of manufacturing an optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, the method comprising the steps of:

providing a resist layer on a surface of a first medium;

removing portions of the resist layer to form vacancies;

removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium;

- 10       filling the cavities in the first medium with a second medium; and  
          removing the resist layer and any excess film of the second medium from the surface of the first medium.

11.       A method according to claim 10 wherein the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium.

12.       A method according to claim 11 wherein the index of refraction of the second medium is greater than the index of refraction of the first medium.

13.       An optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, formed by a method comprising the steps of:

- 5       providing a resist layer on a surface of a first medium;  
          removing portions of the resist layer to form vacancies;  
          removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium;  
          removing the resist layer completely;  
10       filling the cavities in the first medium with a second medium; and  
          removing any excess film of the second medium from the surface of the first medium.

14.       An optical device formed by the method according to claim 13 wherein the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium.

15. An optical device formed by the method according to claim 14 wherein the index of refraction of the second medium is greater than the index of refraction of the first medium.

16. An optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, formed by a method comprising the steps of:

- 5 providing a resist layer on a surface of a first medium;  
removing portions of the resist layer to form vacancies;  
removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium;  
10 filling the cavities in the first medium with a second medium; and  
removing the resist layer and any excess film of the second medium from the surface of the first medium.

17. An optical device formed by the method according to claim 16 wherein the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium .

18. An optical device formed by the method according to claim 17 wherein the index of refraction of the second medium is greater than the index of refraction of the first medium.

19. An optical device comprising:  
a first medium having a thickness, the first medium at least partially forming a first layer and a second layer of the optical device, the first layer defining a plurality of periodically spaced concave portions, the concave portions having a depth less than the  
5 thickness of the first medium; and  
a second medium being dispersed within the concave portions,  
wherein the first layer of the optical device forms a photonic crystal, and

wherein the second layer of the device is formed at least partially of the first medium.

20. An optical device according to claim 19 wherein the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium.

21. An optical device according to claim 20 wherein the index of refraction of the second medium is greater than the index of refraction of the first medium.

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